Wireless Smoking, Vaping & Bullying Alarm Sensor

Wireless Sensor Network Based on LoRa Technology

RA02G Datasheet

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1. Introduction

RA02G is a smoking and noise detector. Cigarette smoke, dust, or smoke of fire. Any particle caused by visible smoke could be detected by RA02G. Indoor environments, such as schools, hospitals, and stations, can be easily monitored by the stable and functional smoking detector. As soon as RA02G detects smoke or excessive noises, it will sound the alarm to alert users.

2. Working Principle

RA02G contains the PM2.5 monitoring module. After the particles pass through the PM2.5 sensor, it detects the changes in PM2.5 concentration. When the concentration exceeds the threshold, RA02G would report data and sound an alarm.

3. Features

- Power adapter (input: 100–240VAC, 50/60HZ; output: DC 12V/1A)
- IP5x (for indoor environment)
- Noise detection (4 levels of thresholds)
- Smoking detection (PM2.5 sensor)
- Anti-tamper alarm (vibration detection)
- SX1276 wireless communication module
- Compatible with LoRa Class C
- Frequency hopping spread spectrum
- Configuration parameters can be configured via a third-party software platform, data can be read and alerts can be set via SMS text and email (optional)
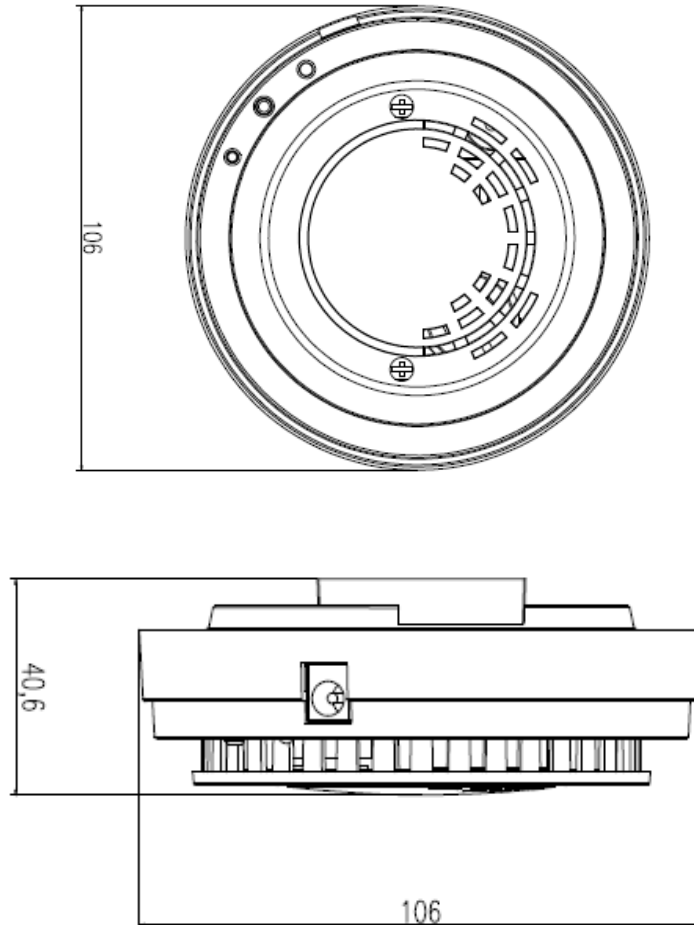- Applicable to third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne

4. Applications

- Residential buildings, hotels, schools, hospitals, banks, office buildings, libraries, museums, meeting rooms, airports, and stations
- Toilets, elevators, and storage rooms

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5. Dimensions

106mm x 40.6mm

6. Electrical specifications

Input Power	DC12V/1A (power adapter)
Power Consumption	Monitoring: <100mA; Sounding alarm: <200mA
Receiving Current	11mA @3.3V
Transmitting Current	120mA @3.3V

Note: The electrical specifications may vary due to the power supply voltage.

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7. Frequency

Frequency Range	863MHz-928MHz 470MHz-510MHz
TX Power	US915 20dbm AS923 16dbm AU915 20dbm CN470 19.15dbm EU868 16dbm KR920 14dbm IN865 20dbm
Rx Sensitivity	-136dBm (LoRa, Spreading Factor=12, Bit Rate=293bps) -121dBm (FSK, Frequency deviation=5kHz, Bit Rate=1.2kbps)
Antenna Type	Build-in antenna
Communication Range	10 km Note: The transmission distance depends on the environment.
Data Transfer Rate	LoRa: 0.3kbps – 50kbps FSK: 1.2kbps – 300kbps
Modulation	LoRa / FSK
Available Frequency	EU863-870, US902-928, AU915-928, KR920-923, AS923-1, AS923-2, AS923-3, IN865-867, CN470-510 (Note: Configured before shipment)

8. PM2.5 Sensor

Operating Voltage	5VDC
Operating Current	100mA (typical value)
Particle Measurement Range	0.3 – 1.0; 1.0 – 2.5um
Particle Counting Efficiency	50%@0.3um, 98%@≥0.5um
Particle Mass Concentration Effective Range (PM2.5 standard value)	$0 – 500\mu g/m^3$
Particle Mass Concentration Resolution	$1\mu g/m^3$
Particle Mass Concentration Consistency (PM2.5 standard value)	$\pm10\%@100 – 500ug/m^3$ $\pm10ug/m3@0 –100ug/m^3$
Comprehensive Response Time	≤10 seconds
Lifetime and Product Consistency	The average time that PMS7003M PM2.5 particle concentration sensor has no faults is 3 years. If the concentration is greater than 300 ug/m^3 for more than 50% of the year, or the concentration exceeds $500ug/m^3$ for more than 20% of the year, the consistency of the sensor will decrease. The data could rise because of internal dust accumulation.

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9. Sensitivity of Smoking Detection

Turn the buttons counterclockwise to select the level of the threshold.

Sensitivity	Level	Threshold (unit: ppm)
High	1	100
	2	150
	3	200
Low	4	250

▲ Four levels of threshold

Note: The threshold could be set before shipment. User could also configure the threshold by twisting the buttons counterclockwise or through commands.

10. Sensitivity of Noise Detection

Twist the button counterclockwise to increase the sensitivity.

Noise Type	Detected decibel value (set sensitivity to the highest)	Detected decibel value (set sensitivity to the lowest)
100HZ	90dB	109dB
1KHZ	100dB	>110dB
10KHZ	103dB	>110dB
Knocking Sound	73dB	92dB
Music	85dB	>110dB

Note: The testing results were obtained when the horizontal distance between RA02G and noise is 1 meter.

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11. Physical Properties

Dimensions	106 mm x 40.6 mm
Weight	TBD
Length of adapter cable	TBD
Ambient Temperature Range	-20°C – 55°C
Ambient Humidity Range	<90%RH (no condensation)
Mounting	Screws